being applied. Application of the various components and light curing was accomplished through an iris having the diameter indicated in the Tables below. Iris diameter was measured in millimeter (mm) units. The load is measured in kilo newtons (kN). The shear bond strength was measured in MPa units. The composite resin used was a hybrid composite, typically TPH™ (L.D. Caulk, Millford, Del.; urethane modified Bis-GMA (urethane modified bisphenol gycidyl methacrylate), TEGDMA (triethylene glycol dimethacrylate), and barium silicate glass filler (avg. particle size of about 0.7 μm)). SBS measurements were taken after the fully treated dental specimen was stored for 24 hours in H_2O at 23° C.

Comparative Example 1

The procedure noted below was followed to obtain the shear bond strength (SBS) values noted in Tables 1–4. The results in Tables 1–4 reflect the use of an iminodiacetic acid without the addition of an acidic component being added thereto. The specific primers utilized were:

1. 6.3% by weight PIDAA in H_2O/acetone (1:1 v/v), and
2. 12.5% by weight PIDAA in H_2O/acetone (1:1 v/v).

A bovine enamel surface was treated with either primer 1. or 2. for 60 seconds. Any excess primer was then gently removed with air. Thereafter, the following adhesive polymer or adhesive monomer was applied by the protocol noted below:

a) 15.1% PMGDM in acetone with 0.07% camphorquinone (CQ) was light cured for 20 seconds and then applied to the above-treated bovine enamel surface through an iris having an iris diameter as indicated in the Tables below and then light cured for 20 seconds followed by the application of 60% bis-GMA and 40% HEMA. The so-treated surface was then light cured for another 60 seconds.

b) Alternatively, the above-noted PMGDM in acetone with CQ of protocol a) was not applied. Instead, the 60% bis-GMA and 40% HEMA were applied through the iris and light cured for 60 seconds.

TABLE 1

Assembly #	Protocol	Iris Diam (mm)	Load (kN)	SBS (MPa)	Mean (MPa)	SD (MPa)
214	1a	3.98	0.182	14.6		
153	1a	3.98	0.107	8.6		
A4	1a	3.98	0.195	15.7		
405	1a	3.98	0.160	12.8		
95	1a	3.98	0.178	14.3	13.2	2.8

TABLE 2

Assembly #	Protocol	Iris Diam (mm)	Load (kN)	SBS (MPa)	Mean (MPa)	SD (MPa)
213	1b	3.98	0.016	1.3		
38	1b	3.97	0.095	7.7		
A9	1b	3.97	0.176	14.2		
206	1b	3.97	0.050	4.0		
69	1b	3.97	0.068	5.5		
A28	1b	3.97	0.082	6.6	6.5	4.4

TABLE 3

Assembly #	Protocol	Iris Diam (mm)	Load (kN)	SBS (MPa)	Mean (MPa)	SD (MPa)
38A	2a	3.97	0.157	12.7		
7AL	2a	3.94	0.213	17.5		
89	2a	3.94	0.171	14.0		
36	2a	3.94	0.189	15.5		
212	2a	3.94	0.188	15.4	15.0	1.8

TABLE 4

Assembly #	Protocol	Iris Diam (mm)	Load (kN)	SBS (MPa)	Mean (MPa)	SD (MPa)
00	2b	3.93	0.429	35.4		
A20	2b	3.93	0.468	38.6		
4	2b	3.93	0.285	23.5		
26	2b	3.93	0.398	32.9		
415	2b	3.93	0.031	2.5	26.6	14.6

Comparative Example 2

The same procedure outlined in Example 1 was used to yield the results indicated in Table 5 below, except that the 6.3% PIDAA and the 12.5% PIDAA solutions of primers 1. and 2. were replaced with H_3PO_4 and protocol b) was utilized.

TABLE 5

Assembly #	Protocol	Iris Diam (mm)	Load (kN)	SBS (MPa)	Mean (MPa)	SD (MPa)
101	H_3PO_4 b	3.91	0.040	3.3		
117	H_3PO_4 b	3.91	0.020	1.7		
A11	H_3PO_4 b	3.91	0.056	4.6		
126	H_3PO_4 b	3.92	0.077	6.4	4.0	2.0

Example 3

The following procedure was used to treat bovine enamel:

1A) 1.25% HNO_3 and 6.4% PIDAA in acetone/H_2O was applied to bovine enamel for 60 seconds. Any excess of HNO_3 and PIDAA was then removed with air. Thereafter, five coats of a mixture of 20% PMGDM and 0.07% CQ in acetone were applied over the mixture of HNO_3 and PIDAA and then light cured for 20 seconds. Then, a mixture of 60% bis-GMA and 40% HEMA was applied and light cured for 20 seconds. Next, a composite resin of TPH™ (L.D. Caulk, Millford, Del.; urethane-modified Bis-GMA, TEGDMA, and barium silicate glass filler (avg. particle size of about 0.7 μm)) was applied and light cured for 60 seconds. The SBS results so-obtained are provided in Table 6 below.

TABLE 6

Assembly #	Protocol	Iris Diam (mm)	Load (kN)	SBS (MPa)	Mean (MPa)	SD (MPa)
131	1A	3.97	0.280	22.7		
47	1A	3.98	0.342	27.5		
36	1A	3.95	0.279	22.8		
112	1A	3.94	0.226	18.5		
36	1A	3.95	0.137	11.2		
39	1A	3.95	0.456	37.2		
108	1A	3.95	0.428	34.9		
72	1A	3.95	0.538	43.9		